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Strategic Reconnaissance and the Verification of the SALT II Agreement

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CH-4-02 Satellites
(orig under
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"VERIFICATION" has become one of the major "red herrings" of the SALT II debate. For all the political attention focused upon verification, the real issue is not the ability to detect and "verify" minor violations of SALT II, but rather the accuracy of the US intelligence community's ability to monitor and predict future improvements in Soviet strategic forces. Many such Soviet improvements will not be affected by the SALT II agreement. Others will not lend themselves to accurate intelligence analysis.

Leaking the Details of the Tools of the Trade

The new Presidential and Congressional sport of "leak" and "counterleak" has ignored these realities in focusing on the far narrower issue of how soon, if ever, the US can recover the Electronic Intelligence (ELINT) capabilities it lost in Iran. Yet, this red herring is interesting for what it has disclosed about US strategic reconnaissance capabilities, and the US' ability to monitor and predict changes in Soviet strategic forces.

While some major inaccuracies have inevitably crept into the press, the various leaks have provided the following broad picture of US capabilities:

- Soviet Intercontinental Ballistic Missile (ICBM) tests are launched from the main Soviet test site at Tyuratam to impact areas in the Kamchatka Peninsula on the Pacific. Soviet telemetry involves approximately 50 channels of information. These channels may be partially encrypted, be designed so that unencrypted data has bias or other errors to prevent outside reading, or be recorded fully or partially in the missile and then be dropped by a recoverable homing parachute, to avoid signals transmission. Accordingly, while ICBM and Sea-launched Ballistic Missile (SLBM) telemetry data can provide a vast amount of information about Soviet missiles, it can be altered or disguised in complex ways, only some of which are as easy to detect as encryption.
- The US has had serious problems in using even unencrypted ELINT and Photo Intelligence (PHOTINT) data and to determine fractionation (numbers of warheads per missile) and accuracy, various sources have reported. Several reports have talked about a separate "secret" means of determining Soviet accuracy, but some intelligence experts admit that such methods have severe limits once Soviet accuracy has reached its current threshold. It is also clear from past reporting on US intelligence estimates that Soviet SLBM performance has been significantly less easy to track than that of ICBMs, although little discussion has taken place in this aspect of the verification issue.

- The only US ELINT posts near enough to monitor all the telemetry from Soviet launches at Tyuratam and military space launches at Baikonur were the National Security Agency sites called Takman I and Takman II at Beshar and Kabkan in Iran. These were large land-based detection and analysis sites located about 650 miles away from Tyuratam, and looked at the site through special electronic windows in the surrounding terrain that allowed their large antennae to capture the entire initial telemetry phase.

- No ELINT site in Turkey or Pakistan can provide similar coverage because of topographic interference effects such as those caused by the Caucasus Mountains. Further, most National Security Agency installations in Turkey such as those at Karamursel, Bexbasi, Princep, Sinop, and Diyarbakir near Pirincilik air base were designed for different purposes, such as monitoring the Intermediate Range Ballistic Missile (IRBM) and Medium Range Ballistic Missile (MRBM) launches at Kapustin Yar.

- Of the two main sites in Turkey, Sinop is located on the Black Sea coast, and is not suited for ICBM launch monitoring. The Army Security Agency/NSA site at Diyarbakir has long range radar, signal intelligence (SIGINT) monitoring capability, and a Defense Satellite Communications facility with direct links to the US, and can provide significant telemetry limitations: US facilities in Turkey also became somewhat obsolete when Turkey forced the US to shut them down after the cut-off in US military aid. They are, therefore, now unable to make full use of the ICBM telemetry data they can collect, and it is unclear exactly what future ICBM data collection will be possible at these sites.

- Current US ELINT satellites, called "Ferret" or "Rhyolite", also have severe limitations. Their high orbits over Asia do cover telemetry once Soviet and Chinese missiles are into space, as well as microwave communications. They cannot, however, cover the critical initial stages of launch telemetry or all channels. This leaves the US with two options for restoring its lost collection capability:

- First, using U-2R or TR-1 variant ELINT aircraft with synthetic aperture (SAR) and side-looking (SLAR) radar. However, this has serious limitations; (a) they can only look about 500 miles into the USSR from an 80,000 foot operating altitude, (b) they must have enough warning to be on station at the Soviet border at launch, (c) antenna and other factors limit the number of large groups of telemetry frequencies, and Turkey and/or Pakistan must agree to basing or overflight.

- Second, the US can launch a third generation ELINT satellite tailored for telemetry, evidently a very large system with SAR and a 60 meter antenna. This has been rejected in the past because (a) the stations in Iran were superior, (b) high cost, (c) some serious technical uncertainties, and (d) vulnerability to encryption. It evidently could be on station as early as 1982 if \$100 million is spent to accelerate it. However, it would cost at least \$200 million, and might well take until 1983-84, if it did not function perfectly on first launch. Even then, it might not provide all past coverage of telemetry.

- The US can also support verification by making improvements and adjustments to existing photo and Infrared (IR) satellites, and by "fine tuning" existing ELINT satellites and land-based facilities designed for other purposes. The US has two basic photo satellites which orbit the USSR every 45 minutes, and which can be directed to cover any specific area in all of the USSR—the KH-11 of "keyhole" which provides continuous photo coverage of the USSR with substantially better than 10 foot resolution, and which continuously relays its imagery by digital signal to the US from a variable 160 nautical mile orbit, and the "Big Bird" or "Argus" which can drop six photo canisters for recovering by C-130 "Skyhooks."

- The US uses these photo satellites to monitor many aspects of Soviet launch and impact, and IR strategic warning satellites to detect Soviet ICBM and SLBM launches as they leave the atmosphere. The photo satellites can produce incredible results under the right conditions. However, even multi-spectral, laser enhanced, and side looking radar data are vulnerable to weather effects, night vision problems, and Soviet actions on the ground which produce gaps or misleading information without actually "concealing" Soviet actions.

- Various other IR and warning satellites provide continuous coverage of the missile "plumes" of Soviet missiles once they leave the atmosphere. Three geo-stationary IR warning satellites have special sensors and on-board data processing for real time detection and observation of Soviet tests. However, such sensors cannot provide warning of a launch in time for US SIGINT aircraft such as the U-2 go be positioned to capture the early stages of launch telemetry. In the past, this has required automated SIGINT sensors which monitor Soviet launch sites on a full time basis.

- The US also has other important verification capabilities. The Cobra Dane satellite on Shemya Island in Alaska is only about 500 miles from the Soviet ICBM impact area in Kamchatka,